California Monthly Climate Summary
May 2011

## Weather Highlights

May 2011 was a wetter and cooler than average month for California. According to the Western Region Climate Center's California Climate Tracker, the monthly average temperature was 55.8°F which is 3.7°F lower than the long-term average of 59.5°F. With a statewide average of 1.40 inches, precipitation in May was 156% of the long term average.

May began with dry and seasonable conditions across the State. Towards the end of the first week a low pressure system out of the Pacific Northwest dropped temperatures and led to scattered precipitation across the northern part of the state. Instabilities following the low pressure system led to some thunderstorms which locally produced up to an inch of rain. In week two, a weak high pressure system built in behind the low warming things a bit before a cold system out of the Gulf of Alaska dropped down and created record cold conditions for Northern California. Snow levels dropped to 2000 feet and more thunderstorms arose in the instabilities following the low. The third week saw a pair of storms bring precipitation across most of the State with temperatures continuing to stay below normal. The fourth week of May continued a pattern of low pressure systems bringing rain with instability thunderstorms following behind the front. During this week a series of tornados touched down in the Sacramento Valley damaging orchards and some structures. Only the desert southeast of the State escaped the cool, wet weather with temperatures topping 100°F in several locations.

Preliminary records, reported on the National Weather Service Record Event Report, show that statewide there were 94 temperature records tied or broken and 27 precipitation records tied or broken for the month. Of the 94 temperature records set, 41 were for new low minimum temperatures and 36 were for new low maximum temperatures. Records were set over 16 days of the month. A number of long-standing records were tied or broken in May. An 1879 record was broken when 0.48 inches of rain fell in downtown Sacramento on May 18. The old record was 0.43 inches. On May 29th, Redding airport recorded a low temperature of 42°F which broke the 1906 record of 44°F. On May 18th Lindbergh Field set a new precipitation record with 0.19 inches of precipitation. The old record of 0.17 inches was set in 1922. On May 3rd Laguna Beach broke a 1931 high minimum temperature record with a reading of 63°F. The old record was 62°F.

For the California Data Exchange Center's (CDEC) network of temperature gages used in this report, 159 stations recorded a minimum temperature below freezing in May while eight stations reached or exceeded 100°F at least once during the month. Statewide extremes from the CDEC network of temperature gages are shown below. Also shown are the monthly average extremes from the CIMIS network. A table of regional average minimum, mean, and maximum temperatures from the CDEC stations is also shown at the end of the summary.

Precipitation in May was well above normal across most of the state with the exception of the Colorado River Basin. For the CDEC precipitation gages for May 2011, the largest amount of precipitation recorded was at Brush Creek in the Sacramento River Region with 8.68 inches. This is 349% of the average precipitation for this station for May. At the other end of the spectrum, 6 stations recorded no precipitation for the month. For the CIMIS network, Camino in El Dorado County topped the precipitation charts with 3.35 inches for the month and 19 stations recorded no precipitation. Some CIMIS gages may show large precipitation totals if the gages are not covered during irrigation activities so care should be given to review precipitation data used from this network. This is normally not an issue in the winter.

The 8-Station Index for northern California precipitation recorded 5.0 inches in May with 20 days showing precipitation. On average, 1.8 inches of precipitation is recorded for the 8-Station index in May. Statewide, the average precipitation for May was 195% of the long-term average based on the California Data Exchange Center (CDEC) gages. Precipitation percentages by region from the CDEC gages are shown in a table at the end of this document.

## CoCoRaHS Update

May 2011 continues California's third year with CoCoRaHS – the Community Collaborative Rain, Hail and Snow Network. This group uses citizen volunteers to record rain, hail and snow data. The users enter the data online at the CoCoRaHS web site. The web site provides the opportunity to see spatial detail of rain and snow patterns in participating states. A map from May 17, 2011 is shown at the end of the document. As of the end of May 2011, California has 786 volunteers signed up spanning 53 of California's 58 counties. The county with the most volunteers at the end of May is Sonoma with 88 volunteers. For the month of May 9,653 reports were recorded for California. The largest daily rain total for CoCoRaHS- CA in May was in Shasta County with 3.99 inches recorded on 5/17/11. Eighteen hail reports were recorded from eight counties. The largest reported hail stones were grape sized in El Dorado County. Fifty-three snow reports were included with the precipitation reports with an 14-inch depth being the largest new snow total from Placer County on the 18th. The largest total snow depth reported was 99 inches reported at 2 sites with one in Placer County and one in Nevada County. Note that 99 inches is the largest number that the observer can enter into the database. In the notes section the Placer County observer notes that over 126 inches of snow depth was present on 5/18/2011. To join CoCoRaHS or find more information, please visit http://www.cocorahs.org.

## Snowpack and Water Supply Conditions

As of the end of May, the snow pillow sensors show the statewide snowpack to be 96% of average for April 1st average peak with a total of 27 inches of snow water equivalent. The Northern Region (from the Trinity to the Feather and Truckee Basins) shows 30 inches of snow water equivalent which is 106% of the April 1st peak. The Central Region (the Yuba Basin to the Merced/Walker Basins) shows 29 inches of

snow water equivalent which is 100% of the April 1st peak. The Southern Region (the San Joaquin Basin to the Kern Basin) shows 18 inches of snow water equivalent which is 73% of the April 1st peak. Water year 2010 resulted in a below normal category for the Sacramento Basin and above normal category for the San Joaquin Basin for the Water Supply Index. The end-of-May Water Supply Index forecast for WY 2011 is wet for the Sacramento Basin and wet for the San Joaquin Basin. Water supply information for California can be found at http://cdec.water.ca.gov/water_supply.html. A historical listing of water year categories for both basins can be found at http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST.

**Drought Monitor and Seasonal Outlook**

The maps for California for April 26, 2011 and May 31, 2011 are shown below. The Drought Monitor maps can be found on the National Drought Mitigation Center's (NDMC) website http://drought.unl.edu/dm/. These maps are largely a reflection of precipitation and soil moisture deficit estimates. As of the May 31st depiction, California is depicted as drought free. Maps are updated weekly.

The U.S. Seasonal Drought Outlook for June through August from NOAA depicts California continuing to be drought free. This forecast is based primarily on climatology and forecast models. Updates are provided twice per month. Maps and information can be found at http://www.cpc.noaa.gov/products/expert_assessment/seasonal_drought.html. The California Nevada River Forecast Center produces some drought monitoring tools for California. These tools look at the frequency associated with precipitation deficits for the Northern California Eight Station Index and the San Joaquin Five Station Index. Another tool looks at the frequency of end-of-month storage for select reservoirs in California. The frequencies of the observations are related to the Drought Monitor's drought categories D0 through D4. These tools can be found at http://www.cnrfc.noaa.gov/climate.php. For May, the Eight Station Index is in drought free conditions for a 12-month and 24 month period. The Five Station Index is also drought free for both periods. All reservoirs have above average storage for this time of year.

**ENSO Conditions and Long-Range Outlooks**

The El Niño/Southern Oscillation (ENSO) has transitioned to ENSO neutral conditions. Equatorial sea surface temperature anomalies for the tropical Pacific have been negative with values of -0.3°C in the Niño 3.4 at the end of May. The March through May 3-month running mean of the Ocean Niño Index (ONI) is -0.6. This is the tenth consecutive ONI value to fall below the -0.5 threshold. Five consecutive ONI values need to be below the threshold for conditions to be classified as a La Niña event. Most forecast models have the tropical sea surface temperatures moving to ENSO neutral conditions, but split on above or below mean conditions by the end of 2011. More information can be found at the Climate Prediction Center's web site: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/

Updates are posted weekly. The latest three month outlook (June through August) from NOAA indicates increased chances of above normal temperatures for the southeastern part of the state and equal chances of above normal or below normal temperature for the rest of the state. For precipitation, equal chances of above or below normal conditions are forecast for the entire state. Outlook plots and discussions can be fount at http://www.wrcc.dri.edu/longrang/. General weather information of interest can be found at http://www.noaawatch.gov/. For anomaly information please see http://www.wrcc.dri.edu/anom/cal_anom.html.

**Agricultural Data**

May 2011 continued winter crop harvests, new crop development, and preparations for spring plantings. Winter wheat, barley and oats began to be harvested. Alfalfa cutting and baling ranged from first to third iterations around the State. Rye, barley and other forage crops continued development. Rice fields were planted. Sunflower seed planting continued in the Sacramento Valley. Cotton, corn and bean fields were planted as field conditions allowed. Almonds were developing slowly due to the cool weather. Walnut orchards bloomed in Lake County. Grapes varied in development from bud break to flowering. Citrus harvest continued with lemons, grapefruit, Valencia oranges, and mandarins being picked. Early cherry crops were harvested and strawberry harvests continued. Vegetable crops were growing well in Kern County with carrots and onions being harvested. Tomato, pepper, carrots, garlic, and onions were growing well. Non-irrigated pasture and rangeland were in good to excellent condition. Bees were active in onion and carrot seed fields while some bees were moved out of state. For further crop information see http://www.nass.usda.gov/index.asp.

**Other Climate Summaries**

California Climate Tracker (new product of Western Region Climate Center)
Golden Gate Weather Service Climate Summary
NOAA Monthly State of the Climate Report

**Statewide Extremes (CDEC)**

High Temperature – 105°F (Buttercup and Cahuilla, Colorado River Desert)
Low Temperature – 0°F (Charlotte Lake, Tulare)
High Precipitation – 8.68 inches (Brush Creek, Sacramento Basin)
Low Precipitation – 0.0 inches (6 stations)

**Statewide Extremes (CIMIS)**

High Average Maximum Temperature – 100.6 $^{0}$F (Westmorland North, Imperial County)
Low Average Minimum Temperature – 29.3 $^{0}$F (Big Bear Lake, San Bernardino County)
High Precipitation – 3.35 inches (Camino, El Dorado County)*
Low Precipitation – 0 inches (19 stations)
*Sometimes irrigation water from sprinklers gets counted as precipitation if the gage is not covered.

## Statewide Precipitation Statistics

| Hydrologic Region | Region Weight | Basin Reporting | | | Stations Reporting | | | % of Historic Average | |
|---|---|---|---|---|---|---|---|---|---|
| | | Basins | May | Oct-May | Stations | May | Oct-May | May | Oct-May |
| North Coast | 0.27 | 5 | 4 | 4 | 15 | 9 | 8 | 131.5% | 115% |
| SF Bay | 0.03 | 3 | 1 | 1 | 6 | 1 | 1 | 262.2% | 135% |
| Central Coast | 0.06 | 5 | 2 | 2 | 10 | 2 | 2 | 226.1% | 152% |
| South Coast | 0.06 | 5 | 5 | 5 | 14 | 9 | 6 | 257.0% | 131% |
| Sacramento River | 0.26 | 10 | 10 | 10 | 42 | 27 | 25 | 221.4% | 126% |
| San Joaquin River | 0.12 | 7 | 6 | 6 | 26 | 15 | 15 | 229.2% | 152% |
| Tulare Lake | 0.07 | 5 | 4 | 4 | 27 | 17 | 17 | 257.9% | 155% |
| North Lahontan | 0.04 | 6 | 6 | 6 | 13 | 11 | 9 | 112.4% | 148% |
| South Lahontan | 0.06 | 5 | 2 | 2 | 14 | 2 | 2 | 235.3% | 216% |
| Colorado River | 0.03 | 2 | 1 | 1 | 6 | 1 | 1 | 33.3% | 138% |
| Statewide Weighted Average | 1 | 53 | 41 | 41 | 173 | 94 | 86 | 195% | 137% |

## Statewide Mean Temperature Data by Hydrologic Region (degrees F)

| Hydrologic Region | No. Stations | Minimum | Average | Maximum |
|---|---|---|---|---|
| North Coast | 22 | 30.8 | 48.8 | 79.9 |
| SF Bay | 8 | 36.9 | 53.2 | 83.8 |
| Central Coast | 13 | 35.3 | 55.2 | 86.9 |
| South Coast | 53 | 37.7 | 58.5 | 90.2 |
| Sacramento | 75 | 36.7 | 56.5 | 88.2 |
| San Joaquin | 46 | 24.8 | 47.2 | 77.2 |
| Tulare Lake | 18 | 21.9 | 45.3 | 72.5 |
| North Lahontan | 26 | 18.2 | 40.1 | 63.2 |
| South Lahontan | 16 | 21.4 | 46.8 | 72.9 |
| Colorado River Desert | 8 | 46.3 | 72.2 | 99.0 |
| Statewide Weighted Average | 285 | 31.3 | 51.7 | 81.9 |

# U.S. Drought Monitor

**April 26, 2011**
Valid 7 a.m. EST

## California

*Drought Conditions (Percent Area)*

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|---|---|---|---|---|---|
| Current | 99.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Last Week (04/19/2011 map) | 99.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 Months Ago (01/25/2011 map) | 99.94 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| Start of Calendar Year (12/28/2010 map) | 98.62 | 1.38 | 0.00 | 0.00 | 0.00 | 0.00 |
| Start of Water Year (09/28/2010 map) | 85.44 | 14.56 | 8.08 | 0.24 | 0.00 | 0.00 |
| One Year Ago (04/20/2010 map) | 67.61 | 32.39 | 9.89 | 7.10 | 0.00 | 0.00 |

*Intensity:*

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

**http://drought.unl.edu/dm**

***Released Thursday, April 28, 2011***
***Michael Brewer, National Climatic Data Center NOAA***

# U.S. Drought Monitor

**May 31, 2011**
Valid 7 a.m. EST

## California

*Drought Conditions (Percent Area)*

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|---|---|---|---|---|---|
| Current | 99.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Last Week (05/24/2011 map) | 99.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 Months Ago (03/01/2011 map) | 99.94 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| Start of Calendar Year (12/28/2010 map) | 98.62 | 1.38 | 0.00 | 0.00 | 0.00 | 0.00 |
| Start of Water Year (09/28/2010 map) | 85.44 | 14.56 | 8.08 | 0.24 | 0.00 | 0.00 |
| One Year Ago (05/25/2010 map) | 87.02 | 12.98 | 8.08 | 5.97 | 0.00 | 0.00 |

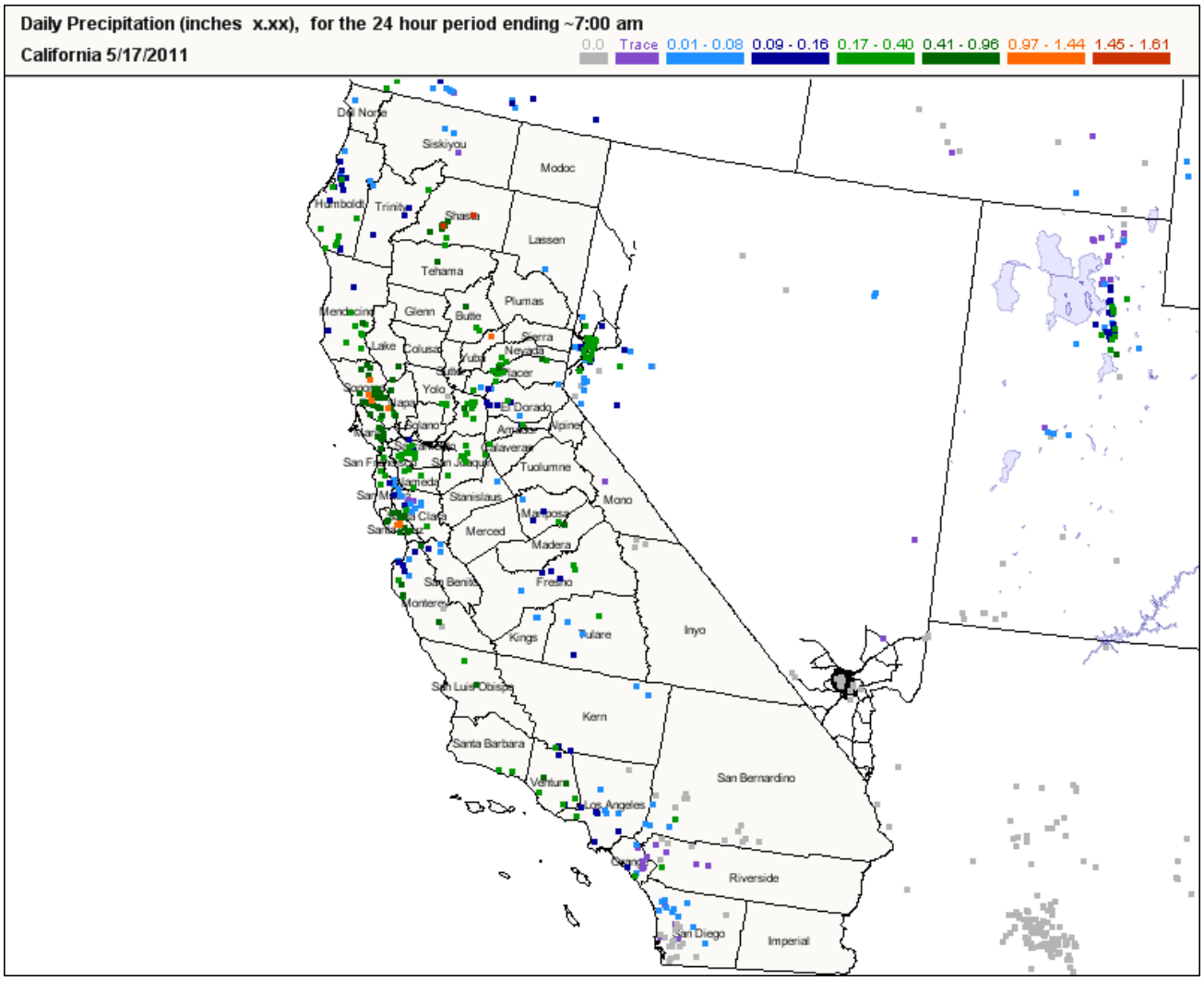
*Intensity:*

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

**http://drought.unl.edu/dm**

***Released Thursday, June 2, 2011***
***Anthony Artusa, NOAA/NWS/NCEP/CPC***


Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am
California 5/17/2011
0.0 Trace 0.01 - 0.08 0.09 - 0.16 0.17 - 0.40 0.41 - 0.96 0.97 - 1.44 1.45 - 1.61
Del Norte
Siskiyou
Modoc
Humboldt
Trinity
Shasta
Lassen
Tehama
Plumas
Mendocino
Glenn
Butte
Sierra
Lake
Colusa
Yuba
Nevada
Placer
Yolo
Napa
El Dorado
Alpine
Solano
Amador
Calaveras
San Francisco
San Joaquin
Tuolumne
Alameda
San Mateo
Stanislaus
Mono
Clara
Santa Cruz
Merced
Mariposa
Madera
San Benito
Fresno
Monterey
Kings
Tulare
Inyo
San Luis Obispo
Kern
Santa Barbara
San Bernardino
Ventura
Los Angeles
Orange
Riverside
San Diego
Imperial